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Time Line Analysis Paper

Regina Wright

[Regina.wright@waldenu.edu](mailto:Regina.wright@waldenu.edu)

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The three decades that have been chosen are: 1960, 1980, and 1990. These three decades appear to have outstanding technological advancements that stand out in history. These advancements have paved the way to enable us to enter into the “Fourth Wave” of Biotechnology and Nanotechnology. Each decade’s technological advancements have changed society, the economy, the business world and its philosophies, and education. As a result, world communication has improved. The invention of the Internet and the World Wide Web, are examples of new convenient ways of communication across the world. Educational opportunities that were once denied to some have been extended. Quality education which has historically been offered to a select group, are now including minorities with improved equal opportunities, and mentally challenged students are becoming mainstreamed as well. Possibilities in medicine and science have come to fruition. The exploration into space, the production of nuclear arms, the cloning of animals and the creation of the human genome are advances that these decades have brought about. The ever changing economy is finding more convenience in areas such as shopping, thanks to technology. Society as it once was is changing and entering into the next wave of life.

Decade 1: 1960

This decade is a very important decade as far as technological advancement is concerned. Innovative computer accessories such as the Computer Mouse were invented in 1968. Compact discs (CD's) were developed in 1965. These two innovations were invented to make the computer easier to use and to improve memory storage. (Bellis, The 60s- the technology, science, and inventions, 2009) The handheld calculator (1965) was an invention that opened the possibilities for new inventions of the future that could be transformed into smaller, more mobile, and more accessible. (Bellis, The 60s- the technology, science, and inventions, 2009) The handheld calculator was designed to be used by students, businesspeople, and in regular homes alike. Another key technological tool that was invented during the 60's was the cassette tape recorder (1962). (Bellis, The 60s- the technology, science, and inventions, 2009) The cassette tape was small, more accessible than the album, or previous recording media. These important advancements mentioned, played important roles in the other key technological advancements of this decade.

With regard to Education and Society, the 1960s was a decade that was influenced by technology through the demand of Civil Rights for minorities and for the Civil Rights of the disabled. In the previous waves of technological times, the benefits of education and society were considered a privilege for the elite. During the 1960s, minorities (African-Americans in particular) were fed up with their positions in society. In 1965, riots broke out in Los Angeles, California. (Rosenberg, 2009) These riots were clear displays of the frustrations due to the lack of Civil Rights. The rioting was about wanting equal opportunities in the work place, in voting, and especially in education. It was not uncommon to have students demonstrating for changes. "Students were the driving force because with education comes empowerment and with empowerment comes a voice, and in the 60's students learnt how to use that voice." (The 1960s, 2009)--with this quest for empowerment came a realization and need by minorities that this was key in gaining equality. This branched out into improved instruction for everyone, including those with disabilities. 1964, the [Association for Children with Learning Disabilities,](http://www.ldanatl.org/about/history.asp) now the [Learning Disabilities Association of America,](http://www.ldanatl.org/) was formed. (American Educational History: A Hypertext Timeline, 2009)

Educational Theories of instruction were being challenged during this decade as well. Traditional views of behaviorism, programmed instruction, and computer assisted instruction, were starting to be questioned. There was a need to have more than rote drills of instruction and learning. There was a need for cognitive instruction and learning as well. In 1966 [Jerome Bruner's](http://au.geocities.com/vanunoo/Humannature/bruner.html) *Toward a Theory of Instruction* is published. "[His views regarding learning](http://www.personal.psu.edu/sjm256/portfolio/kbase/Theories&Models/Cognitivism/cognitivism.html#bruner) help to popularize the cognitive learning theory as an alternative to behaviorism." (American Educational History: A Hypertext Timeline, 2009) Like those who sought rights out of society, educators sought more comprehension and meaning out of instruction and learning theories.

In 1969, an educational television show entitled Sesame Street first airs. Instructional television was intended to use instructional television programs in a creative and imaginative fashion. (Saettler, 2004, p. 531)

Technology influenced development in the areas of science and medicine in many exciting ways during this decade. The first year, 1960, brought the invention of the Heart Pacemaker, a device implanted into the human heart. It also brought the Weather Satellite (The 1960s, 2009). In 1961 the first human being traveled in Space from Russia. (The 1960s, 2009)In 1962, The first planetary probe, the Venus Probe was created as well as the Communications Satellite by USA Telestar. (The 1960s, 2009)1966 brought Fiber Optics from England. The USA Gemini VIII docked an orbiting satellite, known as Space Docking. (The 1960s, 2009) Finally, Neil Armstrong became the First man on the moon in 1969. (Bellis, The 60s- the technology, science, and inventions, 2009) Economically, technology of the 1960s brought about changes in shopping and both consumer and Federal spending. New types of stores called hypermarkets were being developed. Hypermarkets carry more items than a grocery store. One can purchase anything from food to automotive supplies. The first Wal-Mart and Target stores opened in 1962. (Cheers to 100 Years ... 20th Century Timeline , 2009) Federal spending steadily increased from $92.19 billion in 1960 to $183.64 billion in 1969. (World: Year by Year: 1900-2008)

Society at this point in time was expecting inclusion in education and in the work place. There was a need for equal and fair treatment. In 1960, 20,000 shoe workers in New England went on strike. They successfully earned higher wages as a result. (Timeline of Business History, 2009)

The developments of the technologies of the 1960s caused changes in society that could not be ignored. These innovations and changes of the 1960s also show that society wanted and expected more improvements in their daily lives.

Decade 2: 1980

The 1980s proved to be another decade of great technological innovations. Many developments during this decade improved the inventions of the 1960s, and went even further than could have been imagined. Technology made great strides with inventions during this decade. In 1981 MS-DOS was invented. The IBM PC (personal computer) was also invented this year. Computers were used at home as well as in the workplace. (Bellis, The 80s - the technology, science, and inventions, 2009) In 1984 the CD-Rom was invented, and so was the Apple Macintosh computer. (Bellis, The 80s - the technology, science, and inventions, 2009) The following year, 1985, Windows was created by Microsoft. These three inventions made computer usage more convenient and more accessible to those who would otherwise not have had exposure to computer technology. Video games like Pac-Man, were invented 1981. Games could be played on the computer as well as its own console. (The 1960s, 2009)

In Education, the 1980s was moving away from the behaviorist theory to the cognitive theory in regards to educational technology. “…learners are processors of information and concerns a series of cognitive operations (or processes) that a learner uses in a given situation. (Saettler, 2004, p. 478) With the idea of bringing computers into the home, it is no wonder that Home Instruction was being promoted in 1981 by John Holt's book, *Teach Your Own: A Hopeful Path for Education*. Both ideas of behaviorism and cognitivism could be used in this format of education. Homeschooled children are expected to work independently and at the same time be active not passive learners. (American Educational History: A Hypertext Timeline, 2009)

An educational innovator at this time was Madeline Hunter. She published her [direct instruction teaching model](http://www.msubillings.edu/mjtrewhella/EDCI%20302%20Madeline%20Hunter.htm) in 1982 in her book entitled: *Mastery Teaching*. (American Educational History: A Hypertext Timeline, 2009) Hunter's direct instruction was influenced by Instructional Design Theories and the Task Analysis Approach that Robert Gagne and Leslie Briggs developed. Gagne suggested that instructional principles and instructional theory could best be developed after the completion of an intensive task analysis of the educational objectives. (Saettler, 2004, p. 344) Gagne also believed that "Formative evaluation", a term that was used to identify the process of collecting data and information for the purpose of improving instruction. (Saettler, 2004, p. 345) was necessary in attaining optimal achievement. Hunter 's direct instruction attained this goal. In her seven components of teaching and behavioral objectives she promoted the necessity for there to be content areas (units of learning) to indicate what a student should be able to do at the end of the lesson. These components consist of: (1) objectives; (2) set (hook); (3) standards/expectations; (4) teaching (input, modeling/demo, direction giving, and checking for understanding); (5) guided practice; (6) closure; and (7) independent practice. (Madeline Creek Hunter, 2009) These components made the learning relevant to the student. The student understood what was being taught because it was made clear to them. When purpose is understood, critical thinking can be achieved. (Dr. Thornburg, 2008)

Instructional television programs faced many technical difficulties in the 1970s. As the 1980s came, these problems were improved upon. “…the 1980s with the development of microwave transmission, satellites and videotape recording systems. (Saettler, 2004, p. 532) Computer-assisted instruction was taking place in most school systems. However, the lessons were primarily drill and practice. (Saettler, 2004, p. 535)

In science and medicine, technological influences continue to influence ingenious inventions. In 1982 the Human Growth Hormone was genetically engineered. This process would now open the doors to vast possibilities seen in the next decades. DeoxyriboNucleic Acid.(DNA), was first used to convict criminals in 1987. DNA is a molecule that is a code made up of cells to determine the genetic makeup (hereditary) of humans and other living organisms. DNA contains the instructions needed for an organism to develop, survive and reproduce. (Deoxyribonucleic Acid (DNA), 2009) With such precise physical evidence, solving major crime cases would become more successful. In 1986 the Space Shuttle Challenger, (although fatally unsuccessful), was launched with the mission of space exploration. That same year a devastating nuclear accident took place in Chernobyl. (Bellis, The 80s - the technology, science, and inventions, 2009)

Society in the 1980s faced many changes due to technological influences and especially those from the 1960s. Equal opportunities were still being sought and in a lot of instances, being improved. The first woman, Sandra Day O’Connor, was appointed to the Supreme Court in 1981. However, there were devastations that were the result of the changes that were taking place in society. These devastations, (still prevalent today), include AIDS and famine. Millions of people throughout the world are affected by these epidemics.

Economically, Federal spending continues to rise. From 1980-1989, Federal spending increased from $590.95 billion to $1143.17 billion. Unemployment is steady during this time, but has increased from the 1960s. (World: Year by Year: 1900-2008)

Decade: 1990

1990 is the third decade of technological importance in this analysis. Many inventions and advancements of the 1960s and the 1980s were expanded and improved in ways that led to more convenience for society's daily life. Education was further analyzed and improved. Science and medicine changed science fictitious ideas into realities that cause moral dilemmas still today. The need for immediacy in communication and in gratification has been met in this decade as well. Communication itself has been broadened.

Technology has several new and important advancements in this decade. In 1990**,** The [World Wide Web](http://inventors.about.com/od/istartinventions/a/internet.htm) and Internet protocol (HTTP) and WWW language ([HTML](http://inventors.about.com/od/computersoftware/a/html.htm)) were created by [Tim Berners-Lee](http://inventors.about.com/od/bstartinventors/p/TimBernersLee.htm). (Bellis, The 90s - the technology, science, and inventions, 2009) This changed the way the computer would be used in business, education, and at home. New opportunities come with the ability to communicate worldwide expeditiously. In 1995, DVD (Digital Versatile Disc or Digital Video Disc) were invented. Movies could be seen from this disk not only on DVD players, but on computers and laptops as well. (Bellis, The 90s - the technology, science, and inventions, 2009) In 1996 WebTV was invented for those who did not have personal computers in the home, but wanted to have the accessibility to the Web.

The technological influence on education continues to develop. The theory of Constructivism becomes a prevalent theory In Education in the 1990s. In 1993, *In Search of Understanding: The Case for Constructivist Classrooms* a book written by Jacqueline and Martin Brooks is published. It is one many books and articles describing [constructivism,](http://carbon.cudenver.edu/%7Emryder/itc_data/constructivism.html) a view that learning best occurs through active construction of knowledge rather than its passive reception.(American Educational History: A Hypertext Timeline, 2009) Also in this same year, The [Massachusetts Education Reform Act](http://www.doe.mass.edu/edreform/5year/default.html) requires a common curriculum and statewide tests (Massachusetts Comprehensive Assessment System). States around the nation join in on this assessment system. This leads to standardized testing being used as a tool of measurement in promotion to the next level and in graduation requirements. (American Educational History: A Hypertext Timeline, 2009)

Instructional education in the 1990s is moving away from Public television. The new technologies that are on the scene are cable television, direct broadcast satellites, VCRs, and microcomputers. Due to economic setbacks, Public television struggles in this decade to financially support Instructional television programming. (Saettler, 2004, p. 532, 533)

Science and Medicine made advances that were once considered Science fiction. In 1997, the first sheep "Dolly" was cloned. (Bellis, The 90s - the technology, science, and inventions, 2009) Dolly was cloned from the cell of an adult Ewe and was fused with an unfertilized egg cell from which the nucleic DNA had been removed. (The 1960s, 2009) Genetic engineering or genetic modification (GM) is an area that was developed for food, farming, and plants. This one area of the new science, (the new wave), of Biotechnology. GMis used to help make plants resistant to herbicides and insecticides, by the late 90's about 100.00 million acres were planted with Soybean, Maize, Cotton, Canola, and it is estimated that over 60% of products on U.S. grocery shelves include GM ingredients. (The 1960s, 2009)

Society saw many changes that were influenced by technology. There was still a struggle with civil rights as seen in the 1992 riots after Rodney King was beaten by several police officers who were cleared of charges. The verdict was televised and reported on the radio. As a result, riots broke out in several areas throughout the United States. In 1990, Nelson Mandela was freed from prison, giving hope of new improved changes in Civil Rights in South Africa. (Bellis, The 90s - the technology, science, and inventions, 2009)

In 1997, Princess Diana was killed in a car crash that was a result of her and her entourage trying to flee the paparazzi. (Rosenberg, 1997 - Princess Diana Dies in Car Crash. ) This too was an event that the media exploited around the world, via television, radio, magazines, newspapers, and the internet. Another tragic event that took place in 1999 was the Colombine massacre that took at the high school. Two teen aged boys, Dylan Klebold and Eric Harris videotaped their plans for this event. “Klebold and Harris used the Internet to find recipes for pipe bombs and other explosives. They amassed an arsenal, which eventually included guns, knives, and 99 explosive devices.” (Rosenberg, 1999 – Colombine Massacre)

The economy of the 1990s was changing from the first two decades that were analyzed. With the internet growth, shopping could be done online. According to CNN.com, 1998 was when online shopping became mainstreamed. (Online Shopping Goes Mainstream, 1998) Federal spending increased from $1252.52 billion in 1990 to $1716.95 billion. Federal debt was also on the rise. In 1990 it was $3206.6 billion and went up to $5978.5 billion in 1999. Unemployement was still on a steady increase in this decade as well. (World: Year by Year: 1900-2008)

Although there were vast amounts of technological innovations in the 1970s, and 2000s of course, it was the 1960s, 1980s, and 1990s that were three decades that stood out the most in my opinion. There were key technological influences in education, society, business, economics, and science (and medicine) that led to society's entrance into the new wave of Biotechnology and Nanotechnology. As a society, people were questioning and fighting against their traditional roles and status, for equality. This was carried over into education as well. There was a need for improved ways to utilize educational technology. Computer assisted instruction needed to be more than just rote learning. Educational theorist were looking for better understanding of what was being taught, and how to use technological media. There was a real need during these decades for a better and more comfortable way of life. These decades showed how life would include new conveniences and immediacy that would satisfy the changing society. Shopping is an example of an area that transitioned from purchasing goods from a specialty store or a supermarket to hypermarkets, to the Home Shopping Network on TV, to online shopping. Society wanted conveniences in tools and in media devices. Technology in these three decades took computers from machines in the workplace, to personal computers, mobile computers/laptops. The more these tools were made available, the more they were sought out. This led to improved and creative usages. Video games could be played on the computer. Movies could be watched from a DVD on the computer as well.

Society wanted more out of science and medicine as well. The need to explore space and different planets and the moon were sought out during these decades. The need to push the envelope in medicine by learning more about genes and the human genome opened up new opportunities. Biotechnology and Nanotechnology could now be developed, with a need for more technological influence.

The economy needed to support these changes. With the increased Federal spending and the increased federal debt, it appears that society's changing needs were getting a head of the monetary resources available. (This same situation still applies today.) Finally, with changes in society, no matter how beneficial or necessary, there comes conflict. Each decade faced conflicts and devastations from strikes to riots and from famine to massacres. In the first strand of the timeline, the progression from the agricultural wave to the industrial wave and finally to the informational wave, showed how the technological changes affected all sections of society. There was steady growth and advancements that led to improving the current wave’s technology. With each wave there was resistance, and conflicts. However, the underlying theme is the need to expand in innovative ways.

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